Q1

Part A

```
function ave = average(data)
[rows,columns] = size(data);
sum = 0;
for i = 1:rows;
    for j = 1:columns;
        sum = sum + data(i,j);
    end
end
ave = sum/(rows*columns);
```

Part B

```
function sd = stdDev(data)
%Return standard deviation of data. (vectorized code)

[rows,columns] = size(data);
av = average(data);
data = data - av;
data = data .^ 2;
Sum = sum(sum(data));
sd = Sum/(rows*columns);

%Alternate solution:  nonvectorized function
%function sd = stdDev(data)
%
%[rows,columns] = size(data);
%av = average(data);
%sum = 0;
%for i = 1:rows
%   for j = 1:columns
%       data(i,j) = ((data(i,j) - av)^2);
%       Sum = Sum + (data(i,j));
%   end
%end
%sd = Sum/(rows*columns);
```

Q2

```
% Program segment assumes value of NUM is given
maxletter = 'Z';
minletter = 'A';
numletters = maxletter - minletter + 1;

letters = char( floor( minletter + rand(1, num)*( numletters ) ) );
relfreq = zeros(1,  numletters );

for ii = 1: num
   %increment the count of the letter in relfreq for each occurrence
   relfreq( letters( ii ) - minletter + 1 ) = ...
                          relfreq(  letters( ii ) - minletter+ 1 ) + 1;
end

relfreq = relfreq/num
```